

## **The New York Neurological Society.**

MEETING OF OCT. 4TH, 1875.

THE President, Dr. W. A. Hammond, in the chair. After the transaction of the ordinary routine business of the meeting, Dr. Hammond made some remarks relative to the practical use of Dr. Lombard's Thermo-Electro Differential Calorimeter.

He first described the instrument, and then indicated the comparative value of the scale of the instrument and the ordinary thermometer. With the scale, from the 10th to the 35th of a degree can be indicated.

He then proceeded to detail his own observations with it, as follows:

Several years ago, Dr. Lombard, with an instrument not nearly as perfect as the one the results of the use of which I am about to describe, made some very valuable observations relative to the temperature of the head during intense mental exercise. When the mind was engaged in processes of deep thought, a very considerable amount of heat was indicated. I think this was the first observation of the kind made, and the instrument was by no means a perfect one. He spent a great many years and a large amount of money in bringing it to a more perfect condition.

Since I have had this one in my possession I have been performing a number of experiments, and I now propose to give you a brief outline of what I have ascertained by it.

*Sex.*—In the first place, in some thirty instances I found that women are very considerably warmer than men. I suppose that they ought to be, but it has never been accurately proven before. Their temperature is always about three-fourths of a degree higher than that of a man. I have not seen a single instance, in which, under like conditions, the temperature was greater in the male than in the female. The method of ascertaining this temperature is a little different

from the usual manner of using the instrument. By means of a little lamp, which goes with the instrument, one of the poles is kept at a fixed temperature, so that the needle has a certain fixed deflection; then the other pole is put on the head, neck, etc., and the relative temperature is observed. The result is as I have stated.

*Age.*—I think that children are decidedly warmer than adults if they are in good health. There is a difference of about a degree in corresponding portions of the body as compared with adults. The younger the child the greater the difference—that is, the higher the temperature. I have not had an opportunity of examining with the instrument children under two years of age. I do not know what the result would be in the case of infants.

*Position.*—Position makes a great difference—as would naturally be supposed. For instance:—I fasten the two poles to the backs of my hands by means of rubber bands; if I fasten one upon each hand, then hold one hand up and hang the other down, letting it fall naturally by my side, the deflection is very considerable in favor of the hand which hangs by my side.

There is a considerable difference in the two sides of the body. The left side of the head, I think, in all cases—yet I am not sure in the case of two individuals—is the warmer of the two. In these two cases the right side was warmer. In all the rest (300) the left side was hotter, so that this seems to be the rule. That difference continues until we reach the middle of the neck; there, strange to say, the temperature rises upon the other side of the body; the right side of a person is considerably hotter than the left. The deflection will amount to about  $15^{\circ}$  as measured on the scale of this instrument, which would be equivalent to about  $\frac{3}{8}^{\circ}$  of Fahr.

Another very interesting point was observed. If, by means of the ether spray, the skin over the spine is made cold, there is a very notable fall in the temperature of both hands and both arms. Then, if I fasten one pole by any means which will accomplish it, to the middle of the back, and put the other pole upon the left hand, at once the foot becomes colder. That, I think, is a very important observation, pathologically

and physiologically. The same thing applies to the right hand. I am not sure that this observation has been made before, but it strikes me as being very interesting. Any part of the spine above the dorsal region seems to be impressionable in that way; the ether spray thrown upon it causes a loss of heat.

*Muscular Exercise.*—Muscular exertion, as has long been known to be the case, causes very decidedly a rise of temperature. If I fasten one pole on the back of one hand, say the right, then exercise the other arm violently for a short time, and while the pulse runs high I apply the other pole, I find the degree of heat indicated to be about 20+ degrees of the instrument greater on this arm than the other. We all know very well that by muscular exercise the temperature of the parts exercised will be increased; but I do not think it has been so thoroughly or so accurately demonstrated by other means as it has been by this instrument.

*Ingestion of Food.*—The effect on temperature after food has been taken into the stomach forms a very interesting field for observation; but I am not prepared to report upon this subject. Still, there is a very considerable rise of temperature after food has been taken into the stomach. I have not made any observations beyond experimenting with the members of my own family. In many cases, the difference seems to be as much as half a degree Fahr., and sometimes even more than that. The ingestion of stimulants is followed by an increase of the temperature about the head, and in less than half an hour the temperature again falls to its natural point.

I think this fact applies to the whole body; I have tried it on the hands, head, front of the breast, and other parts, and the instrument indicates a decided fall in temperature about one-half hour after stimulants have been taken into the stomach.

Next let us consider the instrument in its pathological relations:

I have used it in cases of facial paralysis, in Graves' disease, in that functional disorder of the auditory nerve known as tinnitus aurium, in hemidiaphoresis (in which the patient sweats only on one side of the body); in hemianæsthesia (where

one side of the body is less sensitive than the other); in hysteria, in neuralgic migraine, in cerebral hæmorrhage, in many cases of injury to the spinal cord; and in all these there has been found invariably a variation of temperature.

Whenever paralysis affects a sensory nerve — it may be in consequence of the fact that the muscles from this cause are not exercised to the natural amount — the difference in temperature is very slight — not more than a twentieth of a degree. I have used the instrument in two dozen cases of facial paralysis. I have used it in two cases of Graves' disease, and found the temperature very considerably augmented about the upper part of the body, especially the head and neck. In fact, the temperature was so great that I could not measure it with the instrument. It amounted to  $6^{\circ}$  or  $8^{\circ}$  at one time, I think. It was so in only one case; in the other the difference was slight, not more than the fraction of a degree.

In two cases of tinnitus aurium, the cause of which I do not know, there was a marked elevation on the side in which the roaring in the ear was heard, in amount about a degree in one case and a fraction of a degree in the other.

In one case of lateral sweating I applied the instrument, and found the heat was increased beyond its power of measurement, because this instrument measures very small fractions of degrees. It will not measure above three degrees of Fahrenheit. If the temperature rises above that, you will be obliged to get a thermometer.

In hysteria, there were some very variable observations. In some, I think, the heat was very notably increased, in various portions of the body. Fixing one of the poles, or piles, rather, in the middle of the back, then putting the other one upon different parts of the body, I find that there is generally a depression of temperature of the head and face; and there is also an elevation; and I find that the hands and extremities are sometimes increased in temperature and sometimes diminished. The observations in hysteria do not teach us anything definite or useful.

In neuralgia, the increase of temperature is marked — occasionally it is so slight that it could not be measured by a thermometer; it can be measured, however slight, by this

instrument. In those parts of the body disturbed there is an increase of temperature, and upon the affected part of the body.

In cerebral hæmorrhage, I have not employed it in any recent case, because the difference in temperature would be too great to be measured; but in old cases the facts are very striking and uniform. There is invariably a loss of temperature in paralyzed parts. There is no exception to this.

Then in cases where variation of temperature cannot be detected by the thermometer—and we are all aware of the great difficulty in this means of detecting temperature—this instrument is exactly suited to the state of affairs. It gives very decided results in cases of cerebral hæmorrhage; I have used it in twenty-two or twenty-three cases.

I have employed it in two cases of injury to the spinal cord: one a man, a commercial traveler, who went out to Nevada last summer for the purpose of collecting, or other business, who, while there, indulged in too violent physical exercise, and strained the bones of his back. He had also, from this cause, a great deal less power in his legs than while in health. There was a slight prominence of the spinal column. It seemed to me that the projection consisted of a growth upon the spinous process, since I could not make out that there was any displacement of the vertebræ. As a consequence of the injury the degree of temperature of that part of the back fell very decidedly. It was less than that which could be measured by the thermometer, yet by this instrument it could be determined very accurately.

Of course it admits of employment in a great many other pathological and physiological conditions, but this is as far as I have gone with it with any definite results.

I exhibit the instrument to the society with the hope that others will take it up and investigate its usefulness; and that it is calculated to be of great service both to the physiologist and the practicing physician, I am very well convinced.